Grade 5 Grade-Level Expanded Expectations

NUMBER SENSE AND OPERATIONS IN BASE TEN: NBT

5.NBT.A	**Use place value system understanding to perform operations with multi-digit whole numbers to billions and decimals to thousandths.**	
5.NBT.A.1	Read, write and identify numbers from billions to thousandths using number names, base ten numerals and expanded form.	The expectation for the student is to read, write and identify numbers from billions to thousandths using base ten numerals, number names and expanded form.
5.NBT.A.2	Compare two numbers from billions to thousandths using the symbols >, = or <, and justify the solution.	The expectation for the student is to compare two numbers from billions to thousandths using the symbols >, = or <, and justify the solution.
5.NBT.A.3	Understand that in a multi-digit number, a digit represents 1/10 times what it would represents in the place to its left.	The expectation for the student is to understand that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
5.NBT.A.4	Evaluate the value of powers of 10 and understand the relationship to the place value system.	The expectation for the student is to evaluate the value of powers of 10 (exponents with a base of 10) and understand the relationship to the place value system. (e.g., 10^1=10, 10^2=100, 10^3=1000, 3 X 10^2=300, etc.)
5.NBT.A.5	Round numbers from billions to thousandths place.	The expectation for the student is to use place value understanding to round whole numbers as well as decimals, including to the nearest whole number, in the context of estimation.
5.NBT.A.6	Add and subtract multi-digit whole numbers and decimals to the thousandths place, and justify the solution.	The expectation for the student is to add and subtract multi-digit whole numbers and decimals to the thousandths place using an appropriate strategy and justify solutions.
5.NBT.A.7	Multiply multi-digit whole numbers and decimals to the hundredths place, and justify the solution.	The expectation for the student is to multiply multi-digit whole numbers and decimals to the hundredths place using an appropriate strategy and justify solutions.

5.NBT.A.8	Divide multi-digit whole numbers and decimals to the hundredths place using up to two-digit divisors and four-digit dividends, and justify the solution.	The expectation for the student is to divide multi-digit whole numbers and decimals to the hundredths place using up to two- digit whole number divisors and four-digit dividends using an appropriate strategy and justify solutions.
NUMBER SENSE AND OPERATIONS IN FRACTIONS: NF		
5.NF.A	**Understand the relationship between fractions and decimals (denominators that are factors of 100).**	
5.NF.A.1	Understand that parts of a whole can be expressed as fractions and/or decimals.	The expectation for the student is to understand that parts of a whole can be expressed as fractions and/or decimals *(Limit to denominators that are factors of 100.).*
5.NF.A.2	Convert decimals to fractions and fractions to decimals.	The expectation for the student is to convert decimals to fractions and fractions to decimals including values greater than one *(Limit to denominators that are factors of 100).*
5.NF.A.3	Compare and order fractions and/or decimals to the thousandths place using the symbols >, = or <, and justify the solution.	The expectation for the student is to compare and order fractions, or decimal numbers to the thousandths place, by reasoning about their size. Record the results of comparisons with symbols >, = or <, and justify the conclusions. (*e.g., by using benchmarks, number lines, manipulatives or drawings)*
5.NF.B	**Perform operations and solve problems with fractions and decimals.**	
5.NF.B.4	Estimate results of sums, differences and products with fractions and decimals to the thousandths.	The expectation for the student is to estimate results of sums, differences and products with fractions and with decimals to thousandths, including numbers greater than one.

5.NF.B.5	Justify the reasonableness of a product when multiplying with fractions. a) Estimate the size of the product based on the size of the two factors. b) Explain why multiplying a given number by a fraction greater than 1 results in a product larger than the given number. c) Explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number. d) Explain why multiplying the numerator and denominator by the same number is equivalent to multiplying the fraction by 1.	The expectation for the student is to justify the reasonableness of a product when multiplying with fractions. a. Estimate the size of the product based on the size of the two factors; b. Explain why multiplying a given number by a number greater than 1 (*e.g., improper fractions, mixed numbers or whole numbers)* results in a product larger than the given number; c. Explain why multiplying a given number by a fraction between zero and 1 results in a product smaller than the given number; d. Explain why multiplying the numerator and denominator by the same number has the same effect as multiplying the fraction by 1.
5.NF.B.6	Solve problems involving addition and subtraction of fractions and mixed numbers with unlike denominators, and justify the solution.	The expectation for the student is to solve problems involving addition and subtraction of fractions with unlike denominators (including mixed numbers) using an appropriate strategy and justify solutions.
5.NF.B.7	Extend the concept of multiplication to multiply a fraction or whole number by a fraction. a) Recognize the relationship between multiplying fractions and finding the areas of rectangles with fractional side lengths. b) Calculate and interpret the product of a fraction by a whole number and a whole number by a fraction. c) Calculate and interpret the product of two fractions less than one.	The expectation for the student is to apply and extend previous understanding of multiplication to multiply a fraction or whole number by a fraction. a. Recognize the relationship between multiplying fractions and finding the areas of rectangles with fractional side lengths; b. Calculate and interpret multiplication of a fraction or a whole number by a fraction. (*e.g., 1/5 x 5/12 is one fifth of five objects called twelfths; 2 ½ x 4/5 is two groups of four fifths and another half-group of four fifths)* c. Calculate and interpret the product of two fractions which are both between zero and one.

5.NF.B.8	Extend the concept of division to divide unit fractions and whole numbers by using visual fraction models and equations. a) Calculate and interpret the quotient of a unit fraction by a non-zero whole number. b) Calculate and interpret the quotient of a whole number by a unit fraction.	The expectation for the student is to extend the concept of division to divide unit fractions and whole numbers by using visual fraction models and equations. a. Calculate and interpret division of a unit fraction by a non-zero whole number and compute the quotient; b. Calculate and interpret division of a whole number by a unit fraction and compute the quotient.
RELATIONSHIPS AND ALGEBRAIC THINKING: RA		
5.RA.A	**Represent and analyze patterns and relationships.**	
5.RA.A.1	Investigate the relationship between two numeric patterns. a) Generate two numeric patterns given two rules. b) Translate two numeric patterns into two sets of ordered pairs. c) Graph numeric patterns on the Cartesian coordinate plane. d) Identify the relationship between two numeric patterns.	The expectation for the student is to investigate the relationship between two numerical patterns expressed as rules, tables, sets of ordered pairs or graphs. a. Generate two numerical patterns given two rules and organize in tables; b. Translate the two numerical patterns into two sets of ordered pairs then graph the two sets of ordered pairs on the same Cartesian plane; c. Graph numeric patterns on the Cartesian coordinate plane; d. Identify the relationship between the two numerical patterns. *(e.g., Given the rule "Starting at 0, add 3" and given the rule "Starting at 0, add 6", generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain this pattern informally.)*
5.RA.A.2	Write a rule to describe or explain a given numeric pattern.	The expectation for the student to given a numerical pattern, write a rule to describe or explain the pattern. *(e.g., Given the pattern 64, 32, 16, … generate the rule. "Starting at 64, divide the previous term by 2"* or *"Starting at 64 multiply the previous term by ½")*
5.RA.B	**Write and interpret numerical expressions.**	

5.RA.B.3	Write, evaluate and interpret numeric expressions using the order of operations.	The expectation for the student is to write, evaluate and interpret numerical expressions using order of operations *(not including exponents)*.
5.RA.B.4	Translate written expressions into algebraic expressions.	The expectation for the student is to translate written expressions into numerical expressions.
5.RA.C	**Use the four operations to represent and solve problems.**	
5.RA.C.5	Solve and justify multi-step problems involving variables, whole numbers, fractions and decimals.	The expectation for the student is to solve multistep word problems using whole numbers, fractions and decimals. Represent these problems as equations with a letter standing for the unknown quantity. Use estimation to assess the reasonableness of answers. *(Exclude division of fractions by fractions.)*
GEOMETRY AND MEASUREMENT: GM		
5.GM.A	**Classify two- and three-dimensional geometric shapes.**	
5.GM.A.1	Understand that attributes belonging to a category of figures also belong to all subcategories.	The expectation for the student is to understand that attributes belonging to a category of two-dimensional or three-dimensional geometric shapes also belong to all subcategories of that category. (e.g., *All rectangles have four right angles and squares are rectangles, so all squares have four right angles.)*
5.GM.A.2	Classify figures in a hierarchy based on properties.	The expectation for the student is to classify figures (e.g., triangles and quadrilaterals) in a hierarchy based on properties.
5.GM.A.3	Analyze and describe the properties of prisms and pyramids.	The expectation for the student is to analyze properties of prisms and pyramids, describing them by the number of edges, faces or vertices as well as the types of bases.
5.GM.B	**Understand and compute volume.**	

5.GM.B.4	Understand the concept of volume and recognize that volume is measured in cubic units. a) Describe a cube with edge length 1 unit as a "unit cube" and is said to have "one cubic unit" of volume and can be used to measure volume. b) Understand that the volume of a right rectangular prism can be found by stacking multiple layers of the base.	The expectation for the student is to understand the concept of volume and recognize that volume is measured in cubic units: a. A cube with edge length 1 unit is called a "unit cube" and is said to have "one cubic unit" of volume and can be used to measure volume. b. Understand that the volume of a right rectangular prism can be found by packing the prism with cubes or stacking multiple layers of the base.
5.GM.B.5	Apply the formulas V = l × w × h and V = B × h for volume of right rectangular prisms with whole-number edge lengths.	The expectation for the student is to apply the formulas $V = l \times w \times h$ and $V = B \times h$ for volume of right rectangular prisms with whole-number edge lengths.
5.GM.C	**Graph points on the Cartesian coordinate plane within the first quadrant to solve problems.**	
5.GM.C.6	Define a first quadrant Cartesian coordinate system. a) Represent the axes as scaled perpendicular number lines that both intersect at 0, the origin. b) Identify any point on the Cartesian coordinate plane by its ordered pair coordinates. c) Define the first number in an ordered pair as the horizontal distance from the origin. d) Define the second number in an ordered pair as the vertical distance from the origin.	The expectation for the student is to define a Cartesian coordinate system. a. The *x*- and *y*- axes are perpendicular number lines that intersect at 0 (the origin); b. Any point on the Cartesian coordinate plane can be represented by its coordinates; c. The first number in an ordered pair is the *x*-coordinate and represents the horizontal distance from the origin; d. The second number in an ordered pair is the *y*-coordinate and represents the vertical distance from the origin.
5.GM.C.7	Plot and interpret points in the first quadrant of the Cartesian coordinate plane.	The expectation for the student is to plot and interpret points in the first quadrant of the Cartesian coordinate plane to represent real-world and mathematical situations.
5.GM.D	**Solve problems involving measurement and conversions within a measurement system.**	

5.GM.D.8	Convert measurements of capacity, length and weight within a given measurement system.	The expectation for the student is to convert measurements of capacity, length and weight within a single measurement system *(customary-to-customary and metric-to-metric systems)*.
5.GM.D.9	Solve multi-step problems that require measurement conversions.	The expectation for the student is to solve multi-step problems that require measurement conversions.
DATA AND STATISTICS: DS		
5.DS.A	**Represent and analyze data.**	
5.DS.A.1	Create a line graph to represent a data set, and analyze the data to answer questions and solve problems.	The expectation for the student is to create a line graph to represent a given or generated data set. Analyze the data to answer questions and solve problems.
5.DS.A.2	Create a line plot to represent a given or generated data set, and analyze the data to answer questions and solve problems, recognizing the outliers and generating the median.	The expectation for the student is to create a line plot to represent a given or generated data set *(data could include fractions or decimals)*. Analyze the data to answer questions and solve problems, recognizing the outliers and generating the median.